



Nutrition Considerations for the Older Adult with CKD

Kristin AR Gustashaw MS RDN CSG LDN
Advanced Level Clinical Dietitian III
Rush University Medical Center
RUSH

NATIONAL KIDNEY FOUNDATION **Interdisciplinary Nephrology Conference**

Disclosure

No financial or non-financial relationships to disclose related to this presentation

NATIONAL KIDNEY FOUNDATION **Interdisciplinary Nephrology Conference**

2

Learning Objectives

- I. Identify physiological changes associated with normal aging as they affect nutritional status
- II. Identify/Assess nutritional status, nutritional needs, and practical considerations in older adults with CKD

NATIONAL KIDNEY FOUNDATION **Interdisciplinary Nephrology Conference**

2



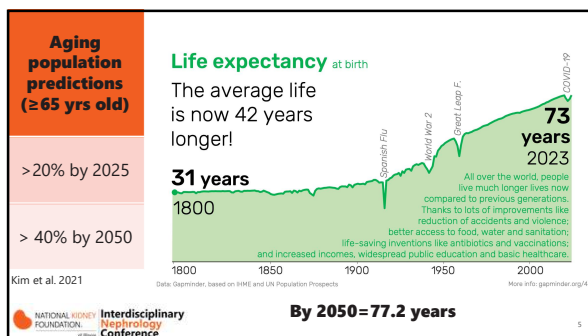
Why Focus on Older Adults?

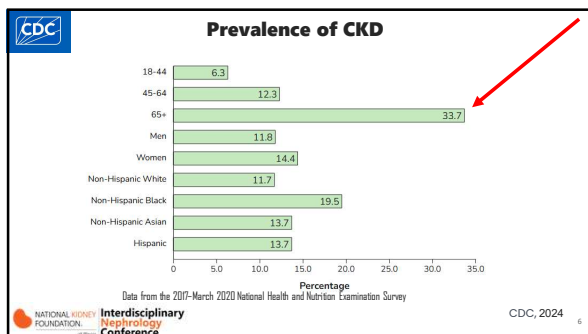
- The number of older adults is rapidly growing!!
- Care is multifactorial and complex
- Age-related declines in kidney function mean standard CKD guidelines may need adaptation
- Risk of malnutrition and protein-energy wasting (PEW) is elevated due to inadequate nutrient intake, metabolic abnormalities
- Personalized MNT proven crucial for improving patient outcomes and quality of life

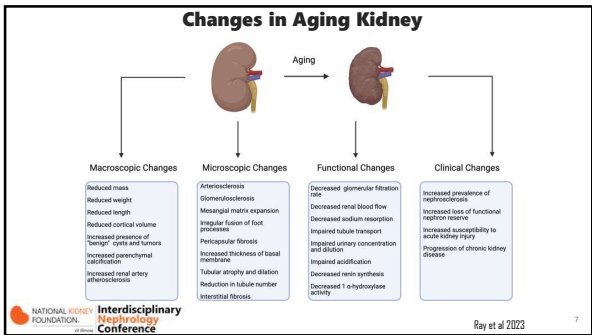


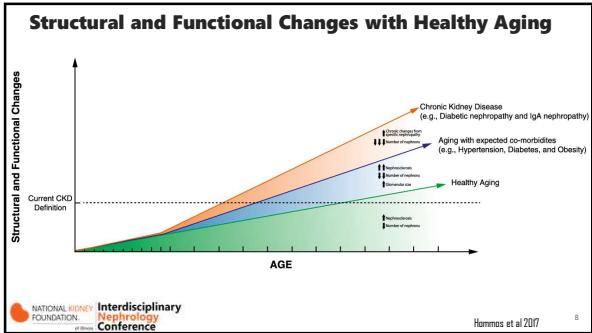
Interdisciplinary Nephrology Conference

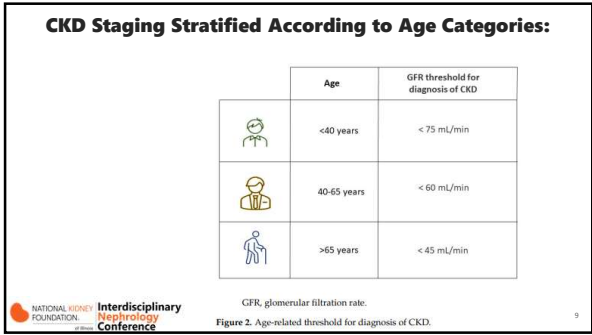
4













Changes with Age

- **Early and Increased Satiety:**
 - Fundus dilation
 - Early dilation of antrum
- Cell division or rate of cell loss of gastric mucosa
 - **Atrophic gastritis**
 - 24% in those 60-69 years old
 - 37% in those 80-99 years old
- HCl
 - increases in colonization of bacteria competing for available B vitamins
- **Decreased B₁₂ absorption**



Changes with Age

- **Diverticulosis**
 - > 50% in those > 80 years old
- **Constipation**
 - 13% in those 45 years old
 - 65-75% in those > 65 years old
- **Gallstones**
 - 6-12% in older men
 - 14-30% in older women



Changes with Age

- ↓ Pepsin activity
 - 25% in those > 60 years old
- ↓ Lactase secretion
 - 6-12% in Caucasians
 - 70% in African-Americans
- ↓ Skin synthesis of Vitamin D



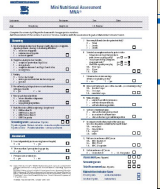
Learning Objective II

- Identify/Assess nutritional status, nutritional needs, and practical consideration of older adults

Nutrition Management

- Screening
- Recommendations
 - Aggressive vs conservative
- Protein Energy Wasting
- Hypertension
- Hyperkalemia
- Blood Glucose Control
- Renal Osteodystrophy
- Anemia

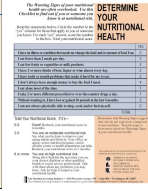
Nutritional Screening/Assessment



MNA
8 minutes



MUST
5 minutes



DETERMINE
Self administered

NATIONAL KIDNEY FOUNDATION Interdisciplinary Nephrology Conference

Nestlé Nutrition Institute

Mini Nutritional Assessment
MNA®
Short Form

A. Has food intake recently (over last 3 months) been reduced or stopped, or is there a problem with eating?

1 = severe decrease in food intake
2 = moderate decrease in food intake
3 = no decrease in food intake

B. Weight loss during the last 3 months

1 = weight loss greater than 3 kg (6.6 lbs)
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
3 = no weight loss

C. Mobility

0 = bed or chair bound
1 = able to get out of bed / chair but does not go out
2 = goes out

D. Has suffered psychological stress or acute disease in the past 3 months?

0 = yes
1 = no

E. Neuropsychological problems

0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems

F1 Body Mass Index (BMI) (weight in kg) / (height in m²)

0 = BMI less than 18
1 = BMI 18 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater

F2 Gait circumference (GC) in cm

0 = GC less than 31
1 = GC 31 or greater

Screening score (max. 14 points)

12-14 points: ☐ Normal nutritional status
8-11 points: ☐ At risk of malnutrition
0-7 points: ☐ Malnourished

☐ 0

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11

☐ 12

☐ 13

☐ 14

NATIONAL KIDNEY FOUNDATION Interdisciplinary Nephrology Conference

Figure 4 | Special considerations for chronic kidney disease (CKD) care across the lifespan.



Children

- Chronic kidney disease (CKD) is a leading cause of end-stage renal disease (ESRD) in children.
- Early identification and treatment are crucial to prevent progression to ESRD.
- Management focuses on controlling blood pressure, proteinuria, and anemia.
- Kidney transplantation is the preferred treatment for ESRD in children.

Young adults

- CKD is often asymptomatic in young adults, leading to delayed diagnosis.
- Management focuses on controlling blood pressure, proteinuria, and anemia.
- Kidney transplantation is the preferred treatment for ESRD in young adults.

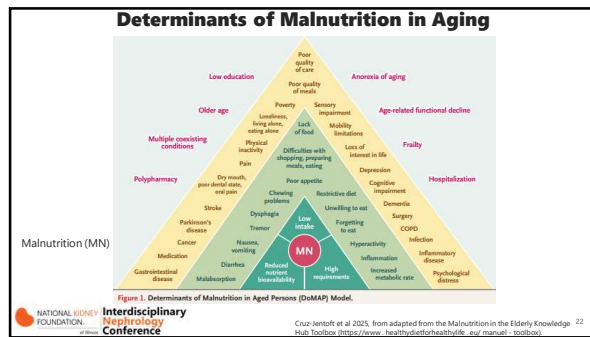
Older adults

- CKD is often asymptomatic in older adults, leading to delayed diagnosis.
- Management focuses on controlling blood pressure, proteinuria, and anemia.
- Kidney transplantation is the preferred treatment for ESRD in older adults.

Older adults (Special considerations):

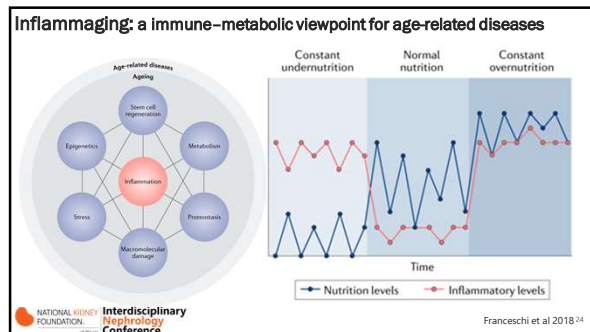
- Multidimensionality of chronic conditions/ multimorbidity
- Frailty (including sarcopenia)
- Cognitive function
- Polypharmacy
- Prioritization
- End-of-life care

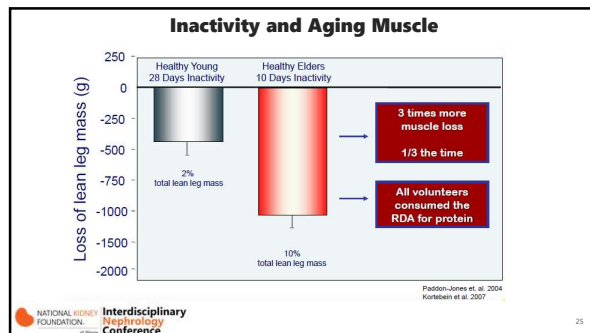
NATIONAL KIDNEY FOUNDATION Interdisciplinary Nephrology Conference

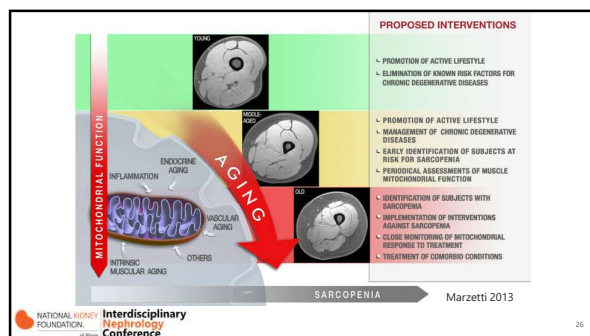


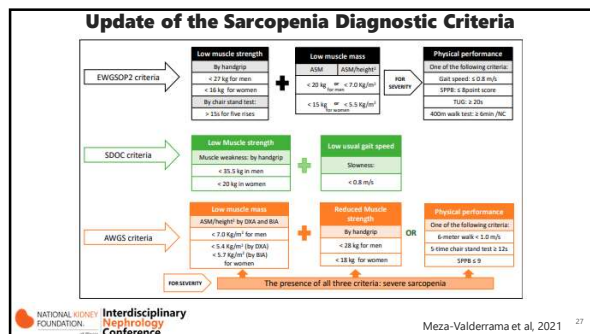
Factors Affecting Nutritional Status & Older Adults

- 1 out of 2 at risk for malnutrition/already malnourished
- 16% of those independent at high risk for malnutrition
- Up to 60% in health care settings are malnourished
- 9 million cannot afford nutritious food
- 1 in 4 adults (25%) aged ≥65 years reduces meal sizes or skip meals
- Tooth loss, poor dental health, loss of appetite, and changes in taste









Grip Strength

GRIP STRENGTH FOR WOMEN (KG)

Age	Top 10%	Top 25%	Good	Fair	Lowest 25%
20	>36.2	32.4 → 36.2	28.3 → 32.3	24.3 → 28.2	<24.2
30	>38.7	34.3 → 38.6	30.6 → 34.2	26.7 → 30.5	<26.6
40	>38.5	34.5 → 38.4	30.7 → 34.4	26.8 → 30.6	<26.7
50	>36.5	32.6 → 36.4	28.7 → 32.5	24.9 → 28.6	<24.8
60	>33.5	30.4 → 33.4	26.5 → 30.3	22.2 → 26.4	<22.1
70	>30.3	26.6 → 30.2	23.5 → 26.5	19.7 → 23.4	<19.6
80	>25.7	22.5 → 25.5	19.5 → 22.4	15.5 → 18.4	<15.4
90	>20.0	17.0 → 19.9	14.0 → 16.9	11.0 → 13.9	<10.9

GRIP STRENGTH FOR MEN (KG)

Age	Top 10%	Top 25%	Good	Fair	Lowest 25%
20	>53.6	47.6 → 53.5	41.7 → 47.5	36.4 → 41.6	<36.3
30	>63.0	57.0 → 62.9	50.5 → 56.9	43.9 → 50.4	<43.8
40	>61.8	56.0 → 61.7	49.5 → 55.9	44.0 → 49.4	<43.9
50	>58.9	53.1 → 58.8	47.4 → 53.0	41.3 → 47.3	<41.2
60	>55.4	50.0 → 55.3	44.2 → 49.9	38.6 → 44.3	<38.7
70	>49.6	43.6 → 48.5	38.6 → 43.5	34.1 → 38.5	<34.0
80	>41.6	36.4 → 41.5	31.6 → 36.3	26.5 → 31.5	<26.4
90	>33.0	29.0 → 32.9	25.0 → 28.9	20.0 → 24.9	<19.9

Sources: Daniels, D'Addato et al 2014; Linn, Cohen et al 2020; McGeer, Heiney et al 2019
Grasp and squeeze strength measures for older adults (65-90 years) (NIDDK/NIA/NHLBI)
NIH 707 female participants age 65+
Thurman, Daniels, D'Addato et al 2014; Linn, Cohen et al 2020; McGeer, Heiney et al 2019
Grasp and squeeze strength measures for older adults (65-90 years) (NIDDK/NIA/NHLBI)
NIH 657 male participants age 65+

NATIONAL KIDNEY FOUNDATION Interdisciplinary Nephrology Conference

28

Optimal BMI Range for Older Adults

Females: 31 to 32 kg/m²

Males: 27 to 28 kg/m²

NATIONAL KIDNEY FOUNDATION Interdisciplinary Nephrology Conference

Kotag et al 2022

29

Observing Signs of Deficiencies

Area	Observations	Nutrient
Hair	Dull, sparse, graying	Iron, Protein
Eyes	Pallor of everted lower lids	Iron, Folic Acid, B12
Lips	Pallor, Angular stomatitis	Iron, B6, Folate, B12
Tongue	Beefy red, scarlet, pale, c/o burning sensation	Iron, B6, Folate, B12
Tongue-Texture	Aphthous like ulcers, Glossitis, Leukoplakia	Iron, B6, Folate, B12
Fingernails	Koilonychia (cuplike depressions), pale	Iron, Folate, B12
Skin	Pallor	Iron, Folate, B12

NATIONAL KIDNEY FOUNDATION Interdisciplinary Nephrology Conference

30

Assessing Kidney Function in Older Adults

Current Standard Recommendations for Diagnosis

1. Screening for High-Risk Individuals:

- those over 60
- individuals with other risk factors like diabetes, high blood pressure, heart disease, or a family history of kidney disease.

2. Urine Albumin-Creatinine ratio (uACR)

3. Blood Glomerular Filtration Rate (eGFR)

Confirmation:

Kidney damage is confirmed by repeating these tests over three months or more to rule out acute kidney injury.

Assessing Kidney Function in Older Adults

Table 1. Summary of cystatin C and creatinine function, processing, filtration, and influencing factors and advantages [17,18,20,21].

	Creatinine	Cystatin C
Function	• Heterocyclic nitrogenous compound (113 MDa). • Produced from creatine in muscle. • No physiological function known.	• Endogenous 13 kDa protein. • Synthesized by all nucleated cells. • Cysteine protease inhibitor.
Renal Processing	• Excreted unchanged by kidneys, majority via glomerular filtration but a small amount by active secretion.	• Relatively freely filtered by glomeruli. • Reabsorbed and catabolized by proximal renal tubular cells.
Renal Production	• Constant.	• Constant.
Decreasing Factors	• Increasing age, female gender, Asian ethnicity • Inflammation • Neuromuscular illness or amputation.	• Hypothyroidism.
Increasing Factors	• Black ethnicity. • Increased muscle mass. • High protein diet and supplements.	• Steroid treatment. • Current cigarette smoking. • Chronic inflammation. • Obesity • Hyperthyroidism.
Advantages	• More routinely available. • Standardized assays. • Health care professionals more comfortable with its use.	• Not dependent on muscle mass, physical activity or protein intake. • Less influenced by age or gender. • Rises faster than creatinine (earlier detection).

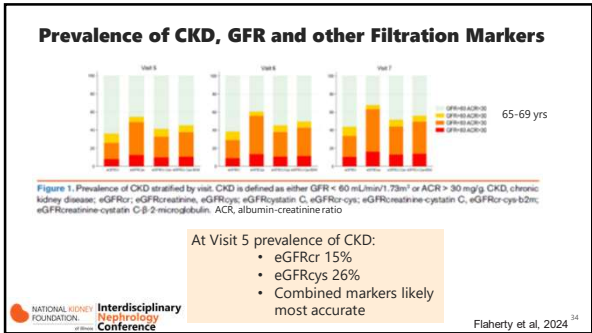
Cystatin C

Health, Aging, and Body Composition cohort study- (2006)- 3000 adults 70-79 yr olds

- A significant association between increasing levels of cystatin C and an elevated risk of mortality, except for cancer

Cardiovascular Health Study (2005)- 4000 adults > 65 yrs old without CKD

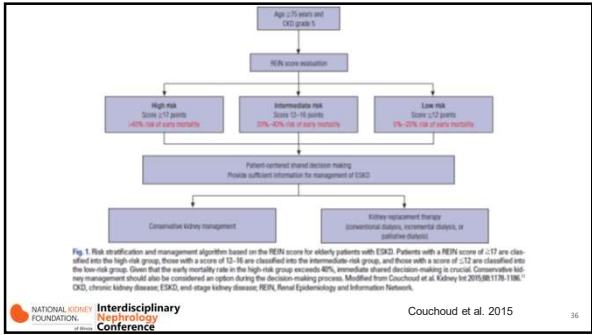
- Serum creatinine concentrations exhibited weaker associations with each of these outcomes and only predicted cardiovascular death
- Participants without CKD but with elevated cystatin C concentrations had a four-fold risk of progressing to CKD within a four-year follow-up period



Renal Epidemiology and Information Network Score (REIN)

- Used to Predict Early Mortality in Elderly Patients with ESKD
 - Score out of 28 points
- Parameters:
 - Sex
 - Age
 - Congestive Heart Failure
 - Peripheral Vascular Disease
 - Arrhythmia
 - Cancer
 - Severe Behavior Disorder (including dementia)
 - Mobility Status
 - Serum Albumin

Couchoud et al. 2015



Conservative Kidney Management (CKM)

- Not simply a non-dialysis therapy
- A Multidimensional
- Patient-centered approach

GOAL:

Improving quality of life vs. focusing on disease-specific treatment

NATIONAL KIDNEY FOUNDATION

Interdisciplinary Nephrology Conference

Couchoud et al. 2015

37

Lifestyle modifications to prevent progression of CKD

NATIONAL KIDNEY FOUNDATION

Interdisciplinary Nephrology Conference

Ray & Hemachandra, 2023

38

CKD THERAPY OPTIONS IN THE OLDER ADULT

Conservative management/ palliative care
KRT (incremental)
Hemodialysis
Peritoneal dialysis
Transplantation

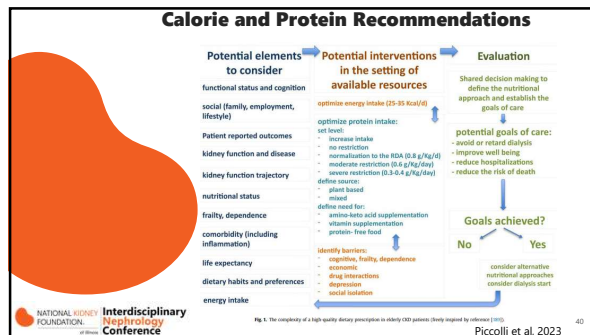
NATIONAL KIDNEY FOUNDATION

Interdisciplinary Nephrology Conference

Pocket Guide to Nutrition Assessment of the Patient with Kidney Disease 6th edition

39

13



Blood Glucose Control

HbA1c

- General recommendation <6.5%
- Up to <8.0% for frail older adults with <10 yr life expectancy

Medications:

- SGLT2 inhibitors (proven kidney and CV benefits)
- Metformin (contraindicated when eGFR <30 mL/min)
- GLP-1 RAs (no eGFR restriction, proven kidney and CV benefits)

Caution: -Hypoglycemia can significantly increase mortality rates
-Watch for medication side effects

NATIONAL KIDNEY FOUNDATION Interdisciplinary Nephrology Conference

Park & Hwang, 2025

41

Hyperkalemia

Manage when serum K level ≥ 5.4 mEq/L

Restriction of dietary potassium intake only if high and no malnutrition

Medication:

- Calcium polystyrene sulfonate (potassium binders)
- Consider discontinuation of offending drugs

Caution: Constipation can itself contribute to hyperkalemia

- Consider osmotic laxatives:
 - ↓ K+ levels with & without K+ binders
- Lactulose
- Polyethylene glycol

NATIONAL KIDNEY FOUNDATION Interdisciplinary Nephrology Conference

42

Renal Osteodystrophy

Prevention is Key- Once occurs, remineralization not likely

- Maintain serum phosphate & calcium levels WNL
- Consider controlling PTH levels
- Restrict phosphorous cautiously
 - Absorption varies based on source:
 - Animal 40-60%
 - Plant 20-50%
 - Processed foods up to 100%

Medications:

- Assess need for Vitamin D
- Consider supplementation if <40 mg/mL

Anemia Management

Target Hemoglobin level of 10–12 g/dL

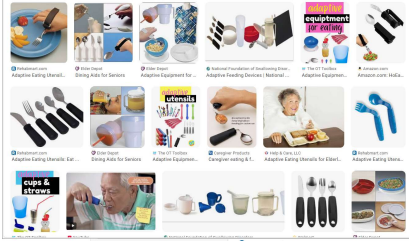
- **Iron supplementation**
 - When serum ferritin ≤ 500 ng/mL and TSAT $\leq 30\%$
 - Erythropoietin-Stimulating Agents (ESAs)
 - Iron supplements (consider IV iron if malabsorption)
- **B12 Supplementation**
 - Methylmalonic acid (MMA) levels $\uparrow$ in kidney insufficiency
 - Check B12 level & MMA

Caution: Mortality increases when Hb >13 g/dL

Education Considerations

- Assess readiness
- Include caregivers
- Keep the instructions simple and short
- 2 to 3 points at each session and review
- Large-print materials, pictures, and food models- consider use of phone apps
- Limit dietary restriction to avoid malnutrition
 - Include the patient's favorite foods
- Consider cultural, ethnic, and religious preferences
- Recognize changes in the senses (taste/smell/vision/touch)
- Address physical limitations with all intake
 - Meal prep; types of containers; adaptive eating devices and equipment

Adaptive Feeding Devices



equipment
per eating

cutlery & dishes

NATIONAL KIDNEY FOUNDATION
Interdisciplinary Nephrology Conference

46

ORIGINAL RESEARCH

Vegetable and Fruit Intake Frequency and Mortality in Patients With and Without Chronic Kidney Disease: A Hospital-Based Cohort Study

Mitsuko Yokoyagi, MD, MPH, PhD,* Akio Yokoyuki, MD, PhD,* Masaharu Hada, MD, PhD,† Takashi Masuoka, MD,‡ Kenji Sato, MD,§ Hisayuki Kawanishi, MD, PhD,|| Katsutoshi Nakamura, MD, PhD,¶ Chisato Otsuoka, MD, PhD,¶ and Akito Naito, MD, PhD,*

Conclusion: A Lower frequency of vegetable and fruit intake is significantly associated with a higher risk of death, regardless of CKD status.

Abstract Patients with an advanced chronic kidney disease (CKD) are generally discouraged from consuming high amounts of vegetable and fruit to prevent potassium (K+) overload. In the general population, however, lower vegetable and fruit intake is associated with higher mortality. This hospital-based cohort study examined whether the frequency of vegetable and fruit intake is associated with mortality, and whether the presence of CKD modifies this association.

Methods Participants were 2,000 patients who visited the outpatient department of a general hospital between June 2008 and December 2015. Mean age was 69 years. Among these participants, 824 (41.2%) and 1,176 (58.8%) were non-dialysis-dependent patients and dialysis-dependent patients, respectively. The frequency of vegetable and fruit intake was determined by a self-report questionnaire using an ordinal scale: "never or rarely," "sometimes," and "every day." Multivariable Cox proportional hazards analysis was conducted, adjusting for potential confounding.

Results Vegetable and fruit intake frequency decreased with worsening CKD stage (P for trend < .001). Dialysis start dates were more delayed for CKD stage were earlier across the three vegetable and fruit intake frequency groups. During a median follow-up of 5.7 years, 851 participants died (42.5% overall). Adjusted hazard ratios relative to the "every day" group were 1.28 (95% confidence interval, 1.04–1.58) and 1.63 (95% confidence interval, 1.23–2.16) for the "sometimes" and "never or rarely" groups, respectively, after adjusting for demographic factors, comorbidities, and CKD status, when stratified by CKD status, a weaker, albeit still significant, dose-dependent relationship was observed between vegetable and fruit intake frequency and all-cause mortality (except for CKD stage, with no other confounders for CKD status, P = .005).

Conclusion A lower frequency of vegetable and fruit intake is significantly associated with a higher risk of death regardless of CKD status.

Key words: CKD, epidemiology, hereditary, hypertension, nutrition

© 2023 The Authors. Published by Elsevier Inc. on behalf of the National Kidney Foundation, Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

NATIONAL KIDNEY FOUNDATION
Interdisciplinary Nephrology Conference

47

The Power of Potassium

For people living with Chronic Kidney Disease

Renal Dietitians
Chronic Kidney Disease
and End-Stage Renal Disease

Super Snack

Instead of a daily protein snack, choose fruits and vegetables. For example, a banana with peanut butter or a smoothie with frozen berries.

Plant-based and vegetable dishes can be a part of your daily diet. Ask your dietitian for more ideas.

Read the label. Look for potassium. Potassium is found in many foods, including fruits, vegetables, and grains.

If you are living with chronic kidney disease, you can eat healthy foods with potassium every day. But it's important to get potassium from your diet. Your dietitian can help with a daily plan that's right for you.

1. Bananas are a good source of potassium. 2. Potatoes are a good source of potassium. 3. Leafy greens are a good source of potassium. 4. Beans are a good source of potassium. 5. Yogurt is a good source of potassium. 6. Milk is a good source of potassium. 7. Tuna is a good source of potassium. 8. Chicken is a good source of potassium. 9. Beef is a good source of potassium. 10. Pork is a good source of potassium.

Tips for Controlling Potassium

Other people often think that potassium is bad for people with kidney disease. But it's not. Potassium is an essential nutrient that helps your heart and muscles work properly. It's also important for your blood pressure to stay in the normal range.

Read the label. Look for potassium. Potassium is found in many foods, including fruits, vegetables, and grains.

Ask your dietitian for more ideas.

How to Reduce Potassium in Potatoes and Other Root Vegetables

1. Peel and cut into small pieces.
2. Soak in water for 2 hours.
3. Boil in water for 10 minutes.
4. Drain and boil again with fresh water.
5. Cook to tender.

Take it to heart: Ask your dietitian how to keep your heart healthy.

NATIONAL KIDNEY FOUNDATION
Interdisciplinary Nephrology Conference

48
